LLNL Environmental Restoration Division Standard Operating Procedure	TITLE: Ground Water Monitor Well and Equipment Maintenance
APPROVAL Date _____ _____ Environmental Chemistry and Biology Group Leader	PREPARER: S. Gregory REVIEWERS: R. Brown*, T. Carlsen, E. Christofferson*, V. Dibley, J. Duarte, B. Failor*, C. Garcia*, J. Greci, B. Goodrich, G. Howard, S. Mathews*, D. Ramsey*, J. Ulrech*, and B. Ward*
APPROVAL Date _____ _____ Division Leader CONCURRENCE Date _____ _____ QA Implementation Coordinator	PROCEDURE NUMBER: ERD SOP-2.12 REVISION: 0 EFFECTIVE DATE: December 1, 1995 Page 1 of 9

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1.0 PURPOSE

To set up a process where all monitor wells and purging/sampling equipment are routinely maintained and are free of potential hazards. These processes will ensure that all ground water sampling activities can take place according to all applicable SOPs without interruptions from equipment failure or personal injury.

2.0 APPLICABILITY

This procedure describes required maintenance and schedules for environmental monitor wells and related equipment. The procedures will be implemented by field support personnel.

3.0 REFERENCES

Not applicable.

4.0 DEFINITIONS

4.1 Christy Box

A cement or steel enclosure for below-grade completed monitor wells installed in areas of vehicular traffic.

4.2 Hydraulic Derrick

A hydraulic crane having a boom hinged near the base of the mast for lifting and moving heavy objects.

4.3 Intake Shroud

A tube or pipe installed on the lower end of an electrical submersible pump that forces the ground water to run past the motor portion of the pump before entering the pump intake. This helps reduce or prevent the pump to over heat during low flow operation.

4.4 Sample Ts

A device composed of PVC pipe and Teflon tubing. It is attached to the discharge line of a submersible pump that allows the majority of the discharge to flow in the direction of the collection container or ground surface, as applicable, but allows a less turbulent flow of ground water through Teflon tubing for sample collection.

4.5 Shiner

A metal tag fixed to the monitor well's cement pad indicating the location that was officially surveyed, providing the coordinates and elevation of the location. The tag is stamped with the monitor well's ID.

4.6 Stove Pipe

A lockable, steel enclosure that prevents unauthorized access to above-grade completed monitor wells. The well ID is painted on the stove pipe for easy identification.

5.0 RESPONSIBILITIES

5.1 Data Management Group (DMG)

The DMG's responsibilities are to maintain and store the Well Maintenance form (Attachment A).

5.2 Division Leader

The Division Leader's responsibility is to ensure that all activities performed by ERD at the Livermore Site and Site 300 are performed safely and comply with all pertinent regulations and procedures, and provide the necessary equipment and resources to accomplish the tasks described in this procedure.

5.3 Environmental Engineering and Field Support Groups (EEFSG)

The EEFSGs are responsible for the majority of the maintenance and repair to the monitor wells and related equipment. They are solely responsible for work requiring the use of the Hydraulic Derrick on the pump truck. The EEFSGs are also solely responsible for returning defective or damaged equipment to the manufacturer or reordering replacement equipment for all dedicated monitoring installations. They are responsible for completing and forwarding the Well Maintenance form to the Data Management Group (DMG) when maintenance is completed. Due to the nature of their responsibilities, the EEFSG personnel should complete the course Back Injury Prevention (HS53001).

5.4 Sampling Coordinator (SC)/Field Personnel

The SC and/or field personnel are responsible for initiating a Well Maintenance Form when sampling or monitoring equipment that need repairs or modifications. They must complete the top portion of the Well Maintenance form (Attachment A) direct it to the EEFSG personnel, and track the completion of requested work. The DMG/SC will update the well table in the EPDDATA base to reflect changes made to well installations.

6.0 PROCEDURES

6.1 Well Maintenance Notification

Other than routine maintenance, missing or nonfunctional equipment is usually discovered by sampling personnel. In order to ensure that the problem is corrected, it is necessary to formally notify the support personnel.

6.1.1 The sampling personnel should notify the ground water SC and/or field support technician (FST) about the problem as soon as possible.

6.1.2 The SC, FST, or person discovering the problem should complete the top portion of the Well Maintenance form (Attachment A) describing the problem. The form must then be forwarded to the support personnel for documentation as discussed below.

6.1.3 In some instances, it may be possible for the SC to arrange for equipment repair or replacement immediately, or make some minor repairs themselves (agreed by the EEFSG), so that the sampling personnel may remain at the location. The form must still be completed to track maintenance.

6.2 Well Head Area Inspection and Maintenance

6.2.1 Each entry into a well head stove pipe or Christy box, must be logged in the well entry logbook. If a problem is discovered during an entry, it should be noted in the well entry logbook, and a Well Maintenance form should be initiated and forwarded to the EEFSG.

6.2.2 Inspections of the well-head area need to be performed during sampling activities to ensure there is no loss of time during environmental monitoring and/or sampling due to faulty equipment or missing items, mislabeled locations, or injuries due to unseen hazards. If during routine sampling

activities, conditions are encountered that require action, the SC and support personnel should be notified. An annual self assessment will be performed to ensure that the installations and related equipment are in good condition.

6.3 Purging/Sampling Equipment Maintenance and Repair

6.3.1 Submersible Pumps

Many problems can arise with a submersible pump if it is not operated regularly. Due to existing ground water sampling schedules, some pump installations are only operated once per year. When possible, these submersible pumps should be started up and operated for a short duration one additional time per year. Some of the submersible pumps (6.3.1, A through C) have additional necessary maintenance, and will need to be removed from the monitor well in order to perform the work. Equipment failure will necessitate repair or replacement. Any time a pump is removed from a monitor well, the well should be sounded with a weighted tape to verify the total depth of the well. All work performed should be properly documented on the Well Maintenance form as described in Section 6.4.

A. Grundfos Submersible Pumps

No routine maintenance other than the preventative work mentioned in 6.3.1 is needed. If a problem is encountered, a description of the problem or the symptoms should be reported as described in 6.3.1. It is necessary to use a derrick on a pump truck for 4-in. submersible pump removal; therefore, only trained personnel may do so.

B. Redi-Flo 2 Electrical Submersible Pumps

Redi-Flo 2 pumps require some extra preventative maintenance. These pumps should be pulled and serviced as per manufacturors recommendations. If a problem is encountered during routine usage, a description of the problem or the symptoms should be reported as described in 6.3.1.

C. Positive Displacement Bladder Pumps (Well Wizard)

Although there is no general maintenance required, if a problem is encountered during routine sampling, repair or replacement may be necessary. Follow manufacturer's instructions for trouble shooting and repair.

6.3.2 Honda Electrical Generators

Electrical generators should be serviced every 50-100 hours of use. This service includes changing the oil and air filter, along with a safety check. ERD personnel using the equipment are responsible for performing maintenance or arranging for the service to be completed. If a problem is encountered during routine usage, a description of the problem or the symptoms is to be reported as described in Section 6.1.

6.3.3 Honda Engine-Driven Air Compressors

The Honda engine-driven air compressors used for the bladder pumps require service on a set schedule. The majority of the maintenance is required every 6 mo or 100 hours of use. See Attachment B, "Maintenance Schedule for Honda Motor for Compressor Unit" for the suggested service intervals. ERD personnel using the equipment will be responsible for checking the equipment log and performing the maintenance or arranging for the service to be done. If a problem is encountered during routine usage, a description of the problem or the symptoms is to be reported as described above in Section 6.1.

6.4 Documentation

After all repair or replacement work is done, a completed Well Maintenance form (Attachment A) should be given to the DMG to file and store, and a copy should be delivered to the SC. It is important that all information is supplied, including the name of the employee performing the work and the date it was completed, so that the SC can reschedule sampling activities. Installation changes, such as a different pump intake depth or a different pump type need to be recorded in the EPDDATA base by the SC or DMG. All maintenance or repair work completed for the Honda generators or compressor units should be documented and stored by the group who purchased the equipment. Each service event should also be recorded in the service log book attached to the equipment.

7.0 QA RECORDS

7.1 Well Maintenance/Pump Repair Tracking Form

8.0 ATTACHMENTS

Attachment A—Well Maintenance Form

Attachment B—Maintenance Schedule for Honda Motor for Compressor Unit

Attachment A

Well Maintenance Form

Well Maintenance / Pump Repair Tracking Form

Location: _____

Repair / Istallation Instructions: **Request Date:** _____

_____

_____

_____

Repair/Installation Requested by: _____

Initial Inspection / Comments **Inspection Date:** _____

_____

_____

_____

Initials: _____

Description of repair / etc.: **Start Repair Date:** _____

_____

_____

_____

During pump replacement activities please provide the following data: (All measurements from top of fixed structure)

Sounded casing depth: _____

Pump Intake depth: _____

Pump type / HP/ Voltage: _____

Pump Started on: _____
Date

Stove Pipe bolted to concrete pad: **Yes** **No** **N/A**

Barrels for purge H20 secured: **Yes** **No** **N/A**

Stove Pipe Christy Box
circle one

Visual inspection of Well Site, (weeds, debris, clean site, etc): _____

Approx hrs. for repair: _____ **Completed Repair Date:** _____ **Account number:** _____

Repair Completed By: _____ _____
Signature Print Name

Original to DMG (Data Management Group T4383 L-528

DMG will provide copies to: Greg Howard; Jerry Duarte; Becky Goodrich; _____
circle one and/or specify other

Attachment A. Well Maintenance Form.

Attachment B

Maintenance Schedule for Honda Motor for Compressor Unit

9. Maintenance

The purpose of the maintenance and adjustment schedule is to keep the engine in good operating condition. Inspect or service as scheduled in the table below.

WARNING — Shut off the engine before performing any maintenance. If the engine must be run, make sure the area is well ventilated. The exhaust contains poisonous carbon monoxide gas.

CAUTION — Use only genuine HONDA parts or their equivalent. The use of replacement parts which are not of equivalent quality may damage the engine.

Maintenance Schedule

REGULAR SERVICE PERIOD Performed at every indicated month or operating hour interval, whichever comes first. / ITEM		Each day of use	First month or 20 Hrs.	Every 3 months or 50 Hrs.	Every 6 months or 100 Hrs.	Every year or 300 Hrs.
Engine oil	Check level	○				
	Change		○		○	
Reduction gear oil (applicable models only)	Check level	○				
	Change		○			○
Air cleaner	Check	○				
	Clean			○ (1)		
Sediment cup	Clean				○	
Spark plug	Check clean				○	
Spark arrestor (optional part)	Clean				○	
Valve clearance	Check–Adjust					○ (2)
Fuel tank and strainer	Clean					○ (2)
Fuel line	Check (Replace if necessary)	Every 3 years (2)				

NOTE: (1) Service more frequently when used in dusty areas.
(2) These items should be serviced by an authorized Honda dealer, unless the owner has the proper tools and is mechanically proficient. See the Honda Shop Manual.

Attachment B. Maintenance schedule for Honda motor used for Well Wizard controller/compressor unit.